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| Seventh Grade Science 2010-2011  Standards Overview | |
| Physical Science | 1. Mixtures of substances can be separated based on their properties such as solubility, boiling points, magnetic properties, and densities. |
| Life Science | 1. Individual organisms with certain traits are more likely than others to survive and have offspring in a specific environment.  2. The human body is composed of atoms, molecules, cells, tissues, organs, and organ systems that have specific functions and interactions.  3. Cells are the smallest unit of life that can function independently and perform all the necessary functions of life.  4. Photosynthesis and cellular respiration are important processes by which energy is acquired and utilized by organisms.  5. Multiple lines of evidence show the evolution of organisms over geologic time. |
| Earth Science | 1. Major geologic events such as earthquakes, volcanic eruptions, mid-ocean ridges, and mountain formation are associated with plate boundaries and attributed to plate motions.  2. Geologic time, history, and changing life forms are indicated by fossils and successive sedimentation, folding, faulting, and uplifting of layers of sedimentary rock |

**1st Quarter 7th grade 2010-2011**

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| Concepts and skills students master:   * 1. Mixtures of substances can be separated based on their properties such as solubility, boiling points, magnetic properties, and densities | |
| Evidence Outcomes Students can: | **21st Century Skills and Readiness Competencies** |
| 1. Identify properties of substances in a mixture that could be used to separate those substances from each other 2. Develop and design a scientific investigation to separate the components of a mixture | **Inquiry Questions:**   1. What techniques can be used to separate mixtures of substances based their properties? 2. Which properties are the most useful in trying to separate mixtures of substances? 3. How much difference must there be among the properties of substances for the properties to be useful in separating the substances? |
| **Relevance and Application:**   1. Materials are sorted based on their properties in a variety of applications. For example, water filtration systems rely on the solubility, density, and physical sizes of substances and recycling facilities use the properties of materials to separate substances in single-stream recycling systems. 2. Mining and oil refining processes use properties to separate materials. 3. The kidneys use properties to filter wastes from the blood. |
| **Nature of Science:**   1. Ask testable questions and make a falsifiable hypothesis about using properties in perform separations, and design a method to find an answer. 2. Evaluate and critique experimental procedures designed to separate mixtures. 3. Share experimental data, and respectfully discuss inconsistent results. 4. Describe several ways in which scientists would study mixtures, and suggest ways that this has contributed to our understanding of materials. |

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| Concepts and skills students master:   * 1. Major geologic events such as earthquakes, volcanic eruptions, mid-ocean ridges, and mountain formation are associated with plate boundaries and attributed to plate motions | |
| Evidence Outcomes Students can: | **21st Century Skills and Readiness Competencies** |
| 1. Gather, analyze, and communicate data that explains Earth’s plates, plate motions, and the results of plate motions 2. Identify, interpret, and explain models of plates motions on Earth 3. Use maps to locate likely geologic “hot spots”, using evidence of earthquakes and volcanic activity 4. Use web-based or other technology tools to show connections and patterns in data about tectonic plate boundaries and earthquakes, volcanic eruptions, and mountain formation | **Inquiry Questions:**   1. How can major geologic events be attributed to plate movement? 2. What evidence supports the theory of plate tectonics? 3. What are the effects of plate movement along plate boundaries? |
| **Relevance and Application:**   1. Computer models and simulations help us understand and make informed decisions about major geologic events. 2. Building codes and emergency plans often reflect natural threats in an area. |
| **Nature of Science:**   1. Construct a model to demonstrate how plate movement results in geologic events. 2. Trace the development of a scientific theory using the theory of plate tectonics. 3. Describe the ethical traditions of science: value peer review; truthful reporting of methods and outcomes; making work public; and sharing a lens of professional skepticism when reviewing the work of others. |

Plus: Safety, Lab Skills & The Scientific Process  (2 weeks)

**2nd Quarter 7th grade 2010-2011**

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| Concepts and skills students master:   * 2. Geologic time, history, and changing life forms are indicated by fossils and successive sedimentation, folding, faulting, and uplifting of layers of sedimentary rock | |
| Evidence Outcomes Students can: | **21st Century Skills and Readiness Competencies** |
| 1. Describe the geologic time scale and why it is used 2. Identify and describe the impact of major geologic events on life on Earth 3. Identify and describe major events in Earth’s geologic history 4. Use direct and indirect evidence to determine the sequence of events in geologic time | **Inquiry Questions:**   1. How can we interpret data from layers of rock? 2. What is geologic time? |
| **Relevance and Application:**   1. Knowledge of Earth’s structure such as knowing where to mine for gold or drill for oil helps humans locate and extract resources.   Dating fossils absolutely and relatively helps assemble the story of the evolution of life on Earth. |
| **Nature of Science:**   1. Ask testable questions and make falsifiable hypotheses on the history of the earth and design a method to find an answer. 2. Describe how scientists study fossils, and suggest ways that understanding fossil evidence contributed to our knowledge about life on Earth over geologic time. |

**3rd Quarter 7th grade 2010-2011**

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| Concepts and skills students master:   * 5. Multiple lines of evidence show the evolution of organisms over geologic time | |
| Evidence Outcomes Students can: | **21st Century Skills and Readiness Competencies** |
| 1. Interpret and analyze data from the fossil record to support a claim that organisms and environments have evolved over time 2. Analyze and critique the evidence regarding the causes and effects of a mass extinction event 3. Analyze and interpret data that show human evolution 4. Use technology to share research findings about the evidence regarding the causes and effects of a mass extinction event | **Inquiry Questions:**   1. What might life on Earth have been like in the distant past, and what evidence is there for this? 2. How does the evidence about the way life has evolved on Earth from long ago tell us about Earth today? |
| **Relevance and Application:**   1. There is growing concern over the current extinction of organisms around the world – and the consequences of these extinctions. |
| **Nature of Science:**   1. Share experimental data, and respectfully discuss conflicting results emulating the practice of scientists. 2. Cite various scientific arguments regarding the causes and effects of mass extinctions. |
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| Concepts and skills students master:   * 3. Cells are the smallest unit of life that can function independently and perform all the necessary functions of life | |
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| 1. Gather, analyze, and interpret data and models on the different types of cells, their structures, components and functions 2. Develop, communicate, and justify an evidence-based scientific explanation regarding cell structures, components, and their specific functions 3. Compare and contrast the basic structures and functions of plant cells, animal cells, and single-celled organisms 4. Employ tools to gather, view, analyze, and report results for the scientific investigations of cells | **Inquiry Questions:**   1. How is the basic structure of a cell related to its function? 2. How are the components – or organelles – of a cell related to the cell’s function? 3. How are various cells unique, and what do they have in common with other cells? |
| **Relevance and Application:**   1. Stem cells are undifferentiated cells that have potential use in medicine. 2. Cancer is caused by a cell that isn’t functioning correctly. 3. Cells can be cultured to benefit humanity. |
| **Nature of Science:**   1. Recognize that our current understanding of cells has developed over centuries of studies by many scientists, and that through continued scientific investigations and advances in data collection, we will continue to refine our understanding of cells. |
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**3rd Quarter 7th grade 2010-2011**

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| Concepts and skills students master:   * 4. Photosynthesis and cellular respiration are important processes by which energy is acquired and utilized by organisms | |
| Evidence Outcomes Students can: | **21st Century Skills and Readiness Competencies** |
| Students can:   1. Gather, analyze, and interpret data regarding the basic functions of photosynthesis and cellular respiration 2. Use direct and indirect evidence to describe the relationship between photosynthesis and cellular respiration within plants – and between plants and animals 3. Use computer simulations to model the relationship between photosynthesis and cellular respiration within plants – and between plants and animals | **Inquiry Questions:**   1. What is the relationship between photosynthesis and cellular respiration? 2. What energy transformations occur in both the processes of photosynthesis and cellular respiration? |
| **Relevance and Application:**   1. Plants are essential for human health and the health and survival of Earth’s ecosystems. 2. The energy in food comes from Sunlight via photosynthesis and is the basis for most ecosystems on earth.   Fossil fuels come from the photosynthesis of organisms that lived millions of years ago. |
| **Nature of Science:**   1. Ask a testable question and make a falsifiable hypothesis about photosynthesis or respiration and design an inquiry based method to find an answer. 2. Design an experiment to observe photosynthesis or respiration, and clearly define controls and variables. 3. Share experimental data, and respectfully discuss conflicting results emulating the practice of scientists. |
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**4th Quarter 7th grade 2010-2011**

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| Concepts and skills students master:   * 2. The human body is composed of atoms, molecules, cells, tissues, organs, and organ systems that have specific functions and interactions | |
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| 1. Develop and design a scientific investigation about human body systems 2. Develop, communicate, and justify an evidence-based scientific explanation regarding the functions and interactions of the human body 3. Gather, analyze, and interpret data and models on the functions and interactions of the human body | **Inquiry Questions:**   1. How does each body system contribute to supporting the life of the organism? 2. How do organs and organ systems in the human body interact to perform specific functions? |
| **Relevance and Application:**   1. There are technologies such as magnetic resonance imaging (MRI), computed tomography (CT) scans, and chemical lab tests that are related to the diagnosis and treatment of the human body’s diseases |
| **Nature of Science:**   1. Critically evaluate models, and identify the strengths and weaknesses of the model in representing our understanding of the human body |

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| Concepts and skills students master:   * 1. Individual organisms with certain traits are more likely than others to survive and have offspring in a specific environment | |
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| 1. Develop, communicate, and justify an evidence-based explanation for why a given organism with specific traits will or will not survive to have offspring in a given environment 2. Analyze and interpret data about specific adaptations to provide evidence and develop claims about differential survival and reproductive success 3. Use information and communication technology tools to gather information from credible sources, analyze findings, and draw conclusions to create and justify an evidence-based scientific explanation 4. Use computer simulations to model differential survival and reproductive success associated with specific traits in a given environment | **Inquiry Questions:**   1. What is the relationship between an organism’s traits and its potential for survival and reproduction? 2. How is the use of the word “adaptation” different in everyday usage than in biology? |
| **Relevance and Application:**   1. Bacteria have evolved to survive in the presence of the environmental pressure of antibiotics – giving rise to antibiotic resistance. 2. Species that can live with humans –such as rats and pigeons – are more common around towns and cities. |
| **Nature of Science:**   1. Create and use sound experimental designs to collect data around survival and genetic traits. 2. Describe several ways in which scientists would study genetics, and suggest ways that this has contributed to our understanding of survival and populations. |

Plus: Health (1 week- some aspects covered in human body)